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证 明

本证明之附件是向本局提交的下列专利申请副本

申 日： 2003 04 14

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PRIORITY DOCUMENT

申 号： 03 2 21219.4

申 别： 实用新型

发 名称： 工作元件的快换夹紧机构

申 人： 苏州宝时得电动工具有限公司

发 计人： 桑树华

中华人民共和国
国家知识产权局局长

王景川

2004 年 2 月 27 日

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权 利 要 求 书

1、一种工作元件的快换夹紧机构，包括输出轴[9]、旋转套[1]、扭簧[8]，所述的输出轴[9]上固定连接有支架[4]，该支架[4]位于所述的旋转套[1]的内腔中，支架[4]的前端部设有支架插槽[14]，所述的旋转套[1]的前端部开有插孔[13]，其特征在于：所述的旋转套[1]的内腔中还设置有旋转体[7]，该旋转体[7]与所述的旋转套[1]相固定连接，所述的支架[4]上开有径向延伸并与支架插槽[14]相连通的锁紧元件导槽[10]，该锁紧元件导槽[10]内设置有与支架[4]枢轴连接的锁紧元件[5]，所述的旋转体[7]的前端部设有一段螺旋面[15]，在工作元件处于被夹紧的状态下，所述的螺旋面[15]顶在所述的锁紧元件[5]的后侧表面上。

2、根据权利要求1所述的工作元件的快换夹紧机构，其特征在于：所述的支架[4]与旋转体[7]的前端面可转动地接触，所述的支架[4]的后侧杆部穿过旋转体[7]的中央孔。

3、根据权利要求1所述的工作元件的快换夹紧机构，其特征在于：所述的扭簧[8]的一端部与固定于旋转套[1]上的旋转体[7]相连接，扭簧[8]的另一端部与输出轴[9]相连接。

4、根据权利要求1所述的工作元件的快换夹紧机构，其特征在于：所述的旋转体[7]上有一个轴向延伸的定位凸筋[12]，所述的旋转套[1]的内腔壁上有一个轴向延伸的定位槽[17]，所述的定位凸筋[12]与定位槽[17]相卡扣，使得旋转体[7]与旋转套[1]相固定连接。

5、根据权利要求1所述的工作元件的快换夹紧机构，其特征在于：所述的旋转体[7]的具有螺旋面的端部具有两个限位凸起[16，19]，所述的支架[4]的朝向螺旋面的端部设有限位销[18]，所述的限位销[18]位于两个限位凸起[16，19]之间。

说 明 书

工作元件的快换夹紧机构

技术领域

本实用新型涉及一种锯类电动工具的工作元件的快换夹紧机构。

背景技术

现有技术中，锯类电动工具，例如曲线锯或往复锯，其锯片快速夹紧机构有 **CN1217675A** 所揭示，其缺点是装配时需要铆接；**US05165173** 采用螺纹夹紧，故装卸锯片不方便；**US05324052** 采用螺纹侧面压紧锯片，但其外型尺寸大，不容易操作。

发明内容

本实用新型的目的在于提供一种体积小而操作方便的工作元件的快换夹紧机构。

本实用新型的技术方案是：一种工作元件的快换夹紧机构，包括输出轴、旋转套、扭簧，所述的输出轴上固定连接有支架，该支架位于所述的旋转套的内腔中，支架的前端部设有支架插槽，所述的旋转套的前端部开有插孔，所述的旋转套的内腔中还设置有旋转体，该旋转体与所述的旋转套相固定连接，所述的支架上开有径向延伸并与支架插槽相连通的锁紧元件导槽，该锁紧元件导槽内设置有与支架枢轴连接的锁紧元件，所述的旋转体的前端部设有一段螺旋面，在工作元件处于被夹紧的状态下，所述的螺旋面顶在所述的锁紧元件的后侧表面上。

本实用新型与现有技术相比具有下列优点：

当转动旋转套时，可以使螺旋面推动锁紧元件，使得锁紧元件压紧工作元件，本实用新型操作方便，结构简单，并且体积小。

附图说明

附图 1 为本实用新型装有工作元件后的立体结构图；

附图 2 为本实用新型的各零部件分解后的立体图；

附图 3 为工作元件插入支架插槽及插孔之前的本实用新型结构主剖视图；

附图 4 为工作元件插入支架插槽及插孔之后的本实用新型结构主剖视图；

附图 5 为工作元件插入支架插槽及插孔之后的本实用新型结构俯剖视图；

附图 6 为工作元件插入支架插槽及插孔之前的本实用新型左视图；

附图 7 为工作元件插入支架插槽及插孔之后的本实用新型左视图；

附图 8 为本实用新型的锁紧元件的立体图；

附图 9 为本实用新型的旋转体的立体图；

其中：1、旋转套； 2、径向凸起； 3、工作元件； 4、支架； 5、锁紧元件； 6、转轴； 7、旋转体； 8、扭簧； 9、输出轴； 10、锁紧元件导槽； 11、定位槽； 12、定位凸筋； 13、插孔； 14、支架插槽； 15、螺旋面； 16、限位凸起； 17、定位槽； 18、限位销； 19、限位凸起； 20、凸肩

具体实施方式

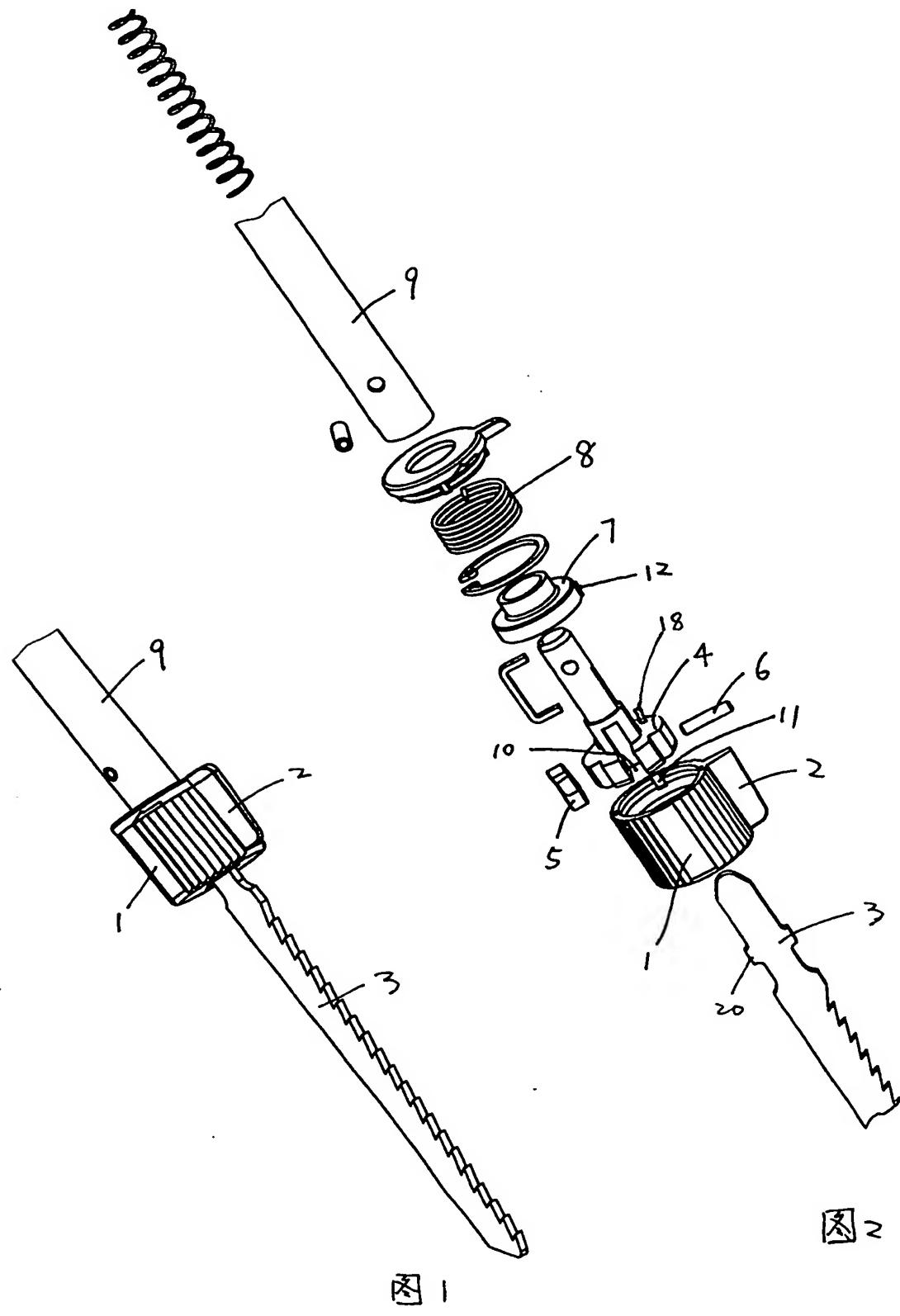
参见附图 1 至附图 2，一种工作元件的快换夹紧机构，包括输出轴 9、旋转套 1、扭簧 8。所述的输出轴 9 上固定连接有支架 4，该支架 4 位于所述的旋转套 1 的内腔中。进一步参见图 6，支架 4 的前端部设有支架插槽 14，以及所述的旋转套 1 的前端部开有与支架插槽 14 相通的插孔 13。所述的旋转套 1 的内腔中还设置有旋转体 7。所述的旋转体 7 上有一个轴向延伸的定位凸筋 12，所述的旋转套 1 的内腔壁上有一个轴向延伸的定位槽 17，所述的定位凸筋 12 与定位槽 17 相卡扣，使得旋转体 7 与旋转套 1 相固定连接。参见图 4 和图 9，所述的旋转体 7 的前端部还设有一逐渐递升的螺旋面 15，在工作元件处于被夹紧的状态下，所述的螺旋面 15 顶在所述的锁紧元件 5 的后侧表面上。所述的旋转体 7 的具有螺旋面的端部具有两个限位凸起 16，19，所述的支架 4 的朝向螺旋面的端部设有限位销 18，所述的限位销 18 位于两个限位凸起 16，19 之间，该两个限位凸起 16，19 可以挡住限位销 18，使得旋转体 7 可在顺时针方向和逆时针方向上被转动限位。

所述的支架 4 上开有径向延伸并与支架插槽 14 相连通的锁紧元件导槽 10。参见图 8，一个具有不规则形状的锁紧元件 5 收容在该锁紧元件导槽 10 内并通过转轴 6 与支架 4 相枢轴连接。所述的支架 4 与旋转体 7 的前端面可转动地接触，所述的支架 4 的后侧杆部穿过旋转体 7 的中央孔。所述的扭簧 8 的一端部与固定于旋转套 1 上的旋转体 7 相连接，扭簧 8 的另一端部与输

出轴 9 相连接。。

在使用时，参见图 3 到图 7，扳动旋转套 1 上的径向凸起 2，在旋转套 1 的插孔 13 与支架插槽 14 相平行时（图 6），工作元件 3 插入支架插槽 14 内，此时对扭簧 8 施加了一个扭力。然后，松开旋转套 1 上的径向凸起 2，在扭簧 8 的扭力作用下，旋转体 7 的螺旋面 15 压紧锁紧元件 5 的后侧表面上，使得锁紧元件 5 围绕转轴 6 向下旋转而压紧工作元件 3，并且同时，旋转套 1 的插孔 13 与支架插槽 14 也即工作元件 3 相错位（图 7），使得工作元件 3 的凸肩 20 被卡在旋转套 1 的插孔 13 内而不会被拔出，从而实现了工作元件的有效夹紧。

说 明 书 附 图



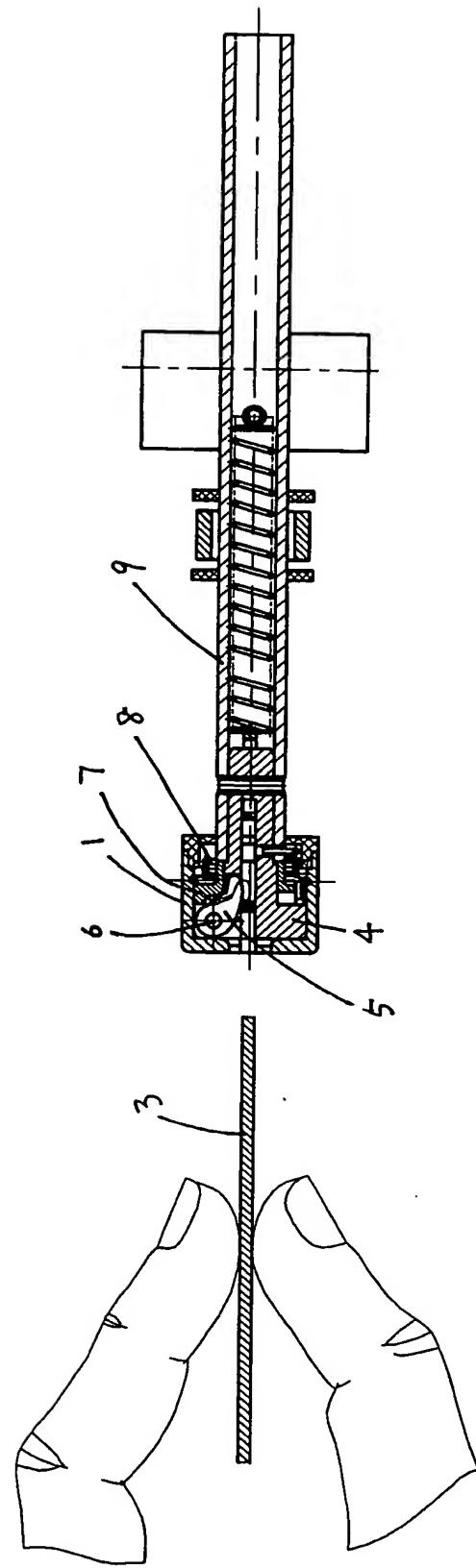


图3

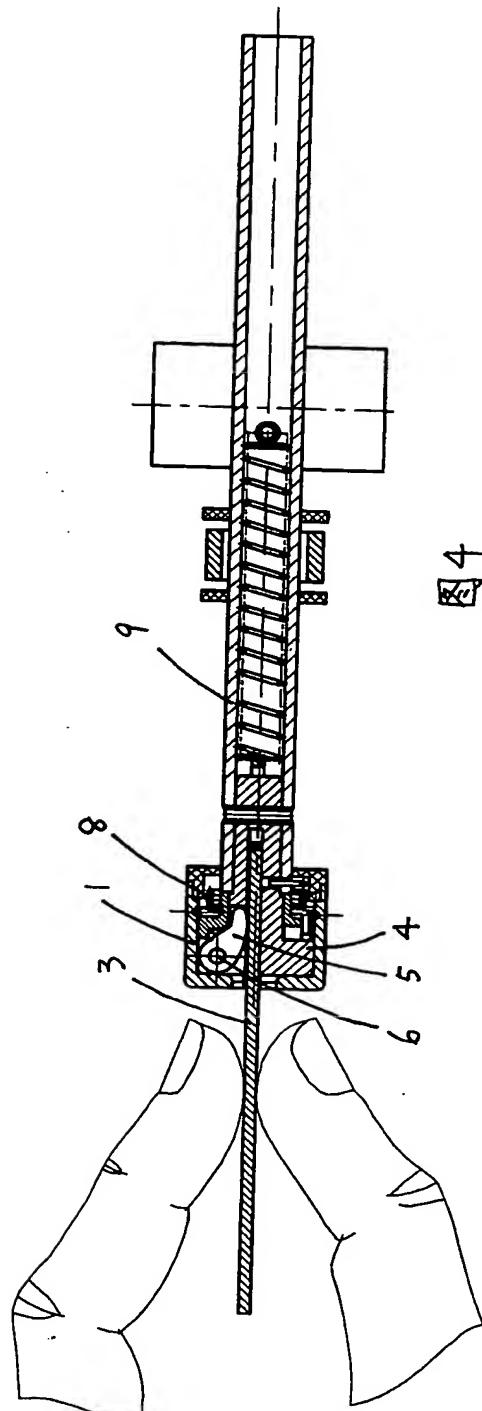


图4

N

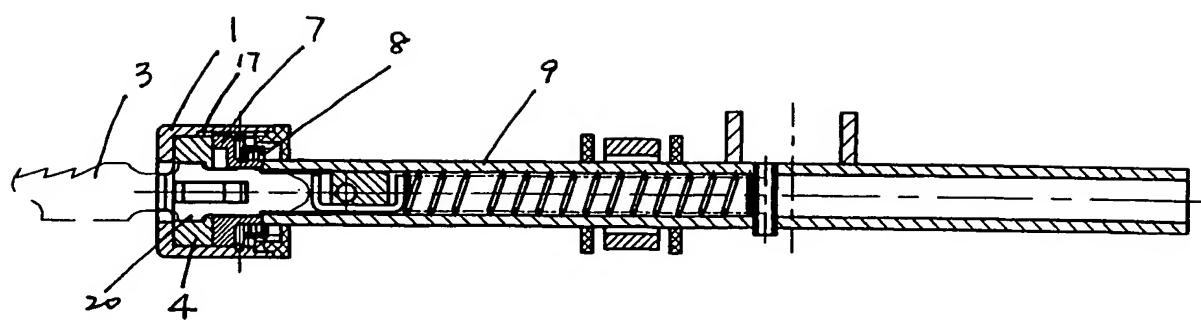


图 5

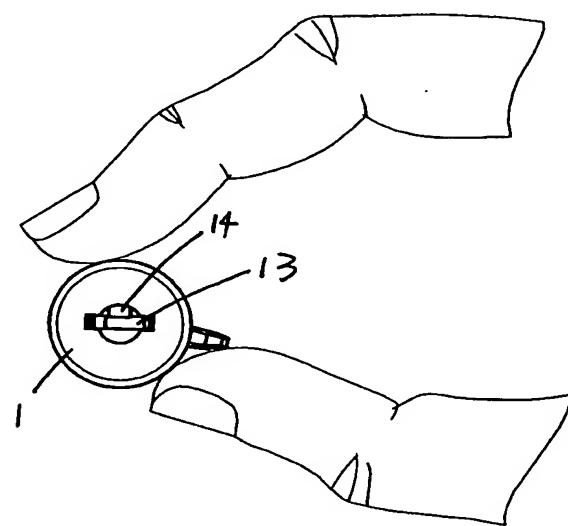


图 6

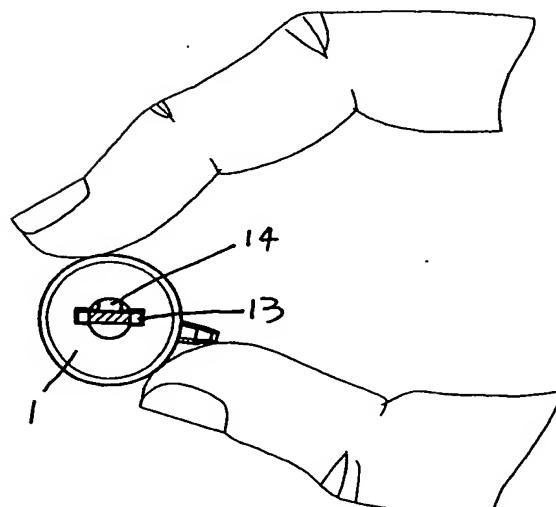


图 7

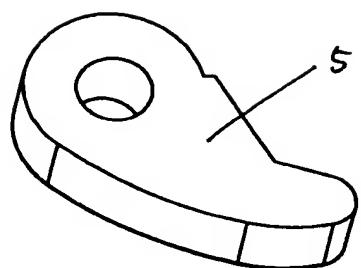


图 8

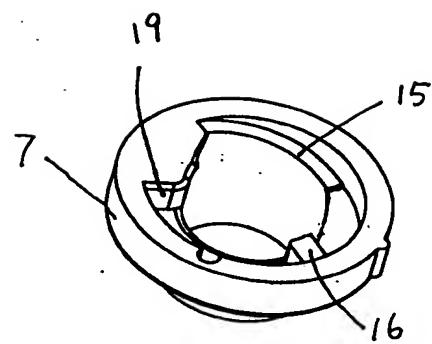


图 9

Chuangyuan Patent & Trademark Agency (Suzhou)

Registered agency in China National Intellectual Property Office (Bureau)
Floor 1st, Technological Building
91 Renmin Road, 215002 Suzhou, China

The Priority Certificate

This certificate is to approve the Priority of following Invention that has been submitted to our office, relative documents see attached.

Filing Date: April. 14, 2003
Application No.: 03 2 21219.4
Type of the application: Utility Model
Name of the invention: Quick Change Saw Blade Clamping device
Applicant: Positec Power Tools (Suzhou) Co., Ltd.
Inventor: Shuhua, Sang

Approved by:

Mr. Wang Rongchuan
The president of State Intellectual Property Bureau
Of P.R.China
Feb. 27th, 2004

Translated and witness by

Mr. Sun Fangwei
The attorney of Chuangyuan Patent & Trademark Agency (Suzhou)
Mar. 15th, 2004



ABSTRACT

A quick-change saw blade clamping device includes an output shaft (9), a rotatable sleeve (1) and a torsion spring (8). The output shaft (9) is coupled to a blade carrier (4) which is disposed within the rotatable sleeve (1). A rotatable member (7) is disposed within the rotatable sleeve (1). A locking member (5) pivotally connected to the blade carrier (4) lies in a guide groove (10) which is formed on the blade carrier (4). A spiral surface (15) is formed on the front end of the rotatable member (7). When the rotatable sleeve (1) is manually rotated, the spiral surface (15) urge the locking member (5) to press against blade into a locking position. The present invention provides an easy-operated, simple-structured and small-sized clamping device.

CLAIM

- 1.A quick-change saw blade clamping device comprising an output shaft (9), a rotatable sleeve (1), and a torsion spring (8), said output shaft (9) is coupled to a blade carrier (4) which is disposed within said rotatable sleeve (1), a blade receiving slot (14) is formed on a front end of said blade carrier (4), a aperture (13) is formed on a front end portion of said rotatable sleeve (1), **characterized in that** said rotatable sleeve (7) is integrally mounted to and disposed within said rotatable sleeve (1), a guide groove (10) radially and axially extending from an outer surface of said blade carrier (4) and communicating with said a blade receiving slot (14), a locking member (5) is pivotally connecting to said blade carrier (4) and disposed in said guide groove (10), a spiral surface (15) disposed at a front head end of said rotatable member (7), under a state in which a blade clamped in a locking position, said spiral surface presses against the rear side surface of said locking member (5).
- 2.The device according to claim 1, wherein said blade carrier (4) rotatably contacts with a front end surface of said rotatable member (7), and a rear rod portion of said blade carrier (4) gets through a center-hole of said rotatable member (7).
- 3.The device according to claim 1, wherein a first end of said torsion spring (8) is connected to said rotatable member (7) which is mounted on said rotatable sleeve (1) and a second end of said torsion spring (8) is connected to said output shaft (9).
- 4.The device according to claim 1, wherein an axial extending protrusive rib provided on the outer surface of said rotatable member (7). An axial extending second retaining groove (17) is formed in the inner surface of said rotatable sleeve (1). Said protrusive rib (12) is fitted into said groove (17) to securely retaining said rotatable member (7) and said rotatable sleeve (1) together.
- 5.The device according to claim 1, wherein two protrusive stoppers (16, 19) provided on the ends of said spiral surface which formed on the rotatable member (7), a end portion of said blade carrier (4) facing to said spiral surface is disposed with a limited pin (18) which is able move between said protrusive stoppers (16, 19).

Field of the invention

The present invention relates to a quick-change saw blade clamping device for power saw such as jigsaws or reciprocating saws.

Background

CN-A-1217675 discloses a clamping device, a drawback of such a blade clamp needs to be riveted together.

In US05165173, the blade is fixed to the drive shaft by means of fixing screws, so it is very inconvenient to remove the saw blade.

In US05324052, the blade is pressed by a spring-loaded clamping piece against a slot wall, but the shape size of the clamping device is very big and the operation is inconvenient.

Summary of the Invention

The object of the present invention is to provide a saw blade able to be quickly changed clamping device.

A quick-change saw blade clamping device comprising an output shaft, a rotatable sleeve, and a torsion spring, said output shaft is coupled to a blade carrier which is disposed within said rotatable sleeve, a blade receiving slot is formed on a front end of said blade carrier, a aperture is formed on a front end portion of said rotatable sleeve, characterized in that said rotatable sleeve is integrally mounted to and disposed within said rotatable sleeve, a guide groove radially and axially extending from an outer surface of said blade carrier and communicating with said a blade receiving slot, a locking member is pivotally connecting to said blade carrier and disposed in said guide groove, a spiral surface disposed at a front head end of said rotatable member, under a state in which a blade clamped in a locking position, said spiral surface presses against the rear side surface of said locking member.

Comparing with the prior arts, the present invention has the following advantages.

When the rotatable sleeve is manually rotated, the locking member is urged to compress the saw blade by the spiral surface. The present invention provides an easy-operated, simple-structured and small-sized clamping device.

BRIEF DESCRIPTION OF THE DRAWING

Fig.1 is a perspective view of the present invention when a blade is disposed within the blade clamp.

Fig.2 is an exploded view of the essential parts of the present invention.

Fig.3 is a main cross-section view of the blade clamp when the blade is not inserted to the blade receiving slot (14) and the aperture (13) of the blade clamp.

Fig. 4 is a cross-section view like that of Fig.3 when the blade is in an inserted position.

Fig.5 is a top cross-section view of Fig.4.

Fig.6 is a left view of Fig.3.

Fig.7 is a left view of Fig.4.

Fig.8 is a perspective view illustrating a detail of a locking member of the present invention.

Fig.9 is a perspective view illustrating a detail of a rotatable member of the present invention.

1. a rotatable sleeve;
2. a projection
- 3.a saw blade
- 4.a blade carrier
- 5.a locking member
- 6.a rotatable shaft
- 7.a rotatable member
- 8.a torsion spring

- 9.an output shaft
- 10.a guiding recess
- 11.a first retaining groove
- 12.a protrusive rib
- 13.an aperture
- 14.a blade receiving slot
- 15.a spiral surface
- 16.a protrusive stopper
- 17.a second retaining groove
- 18.a limited pin
- 19.a protrusive stopper
- 20.a blade projection

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig.1 and Fig.2, a quick-change saw blade clamp device include an output shaft (9), a rotatable sleeve (1), a torsion spring (8). The output shaft (9) is coupled to a blade carrier (4) which is disposed within the rotatable sleeve (1). Referring to Fig.6, a blade receiving slot (14) is defined in the front end of the blade carrier (4), and a aperture (13) which extend across the a blade receiving slot (14) is defined in the front end of the rotatable sleeve (1). A rotatable member (7) is coupled within the rotatable sleeve (1). A axial extending protrusive rib (12) is defined in the outer surface of the rotatable member (7). A second retaining groove (17) is axial extending in the inner surface of the rotatable sleeve (1). The protrusive rib (12) is fitted into the groove (17), thereby securely retaining the rotatable member (7) and rotatable sleeve (1) together. Referring to Fig.4 and Fig.9, the front end of the rotatable member (7) has a spiral surface (15) which is gradually raising. The spiral surface (15) compresses the rear side surface of the locking member (5) when the blade is clamped. Two protrusive stoppers (16, 19) project from the rotatable member (7) end portion which has spiral surface. A limited pin (18) is defined on the blade carrier (4) end surface which faces to the spiral surface. The limited pin (18) moves between the protrusive stopper (16) and the protrusive stopper(19) so as to limit the rotating range of the rotatable member (7) in the clockwise and counter-clockwise direction.

A guide groove (10) extend radial from the outer surface of the blade carrier (4) into the a blade receiving slot (14). Referring to Fig.8, an irregular-shaped locking member (5) is pivoted to the blade carrier (4) in the guide groove(10) by means of a rotatable shaft (6). The blade carrier (4) is in sliding contacts with the front end of the rotatable member (7), and the rear rod of the blade carrier(4) gets through the center-hole of the rotatable member (7). A first end of the torsion spring (8) is connected to the rotatable member (7) which is mounted on the rotatable sleeve (1) and a second end of the torsion spring is connected to the output shaft (9).

Referring to Fig.3 to Fig.7, manually rotated a projection (2) which extends radially from the peripheral surface of the rotatable sleeve (1), thereby storing a torsion force to the torsion spring (8), to the position which the aperture (13) of the rotatable sleeve (1) is parallel to the a blade receiving slot (14) as shown in Fig.6, a saw blade (3) is inserted into the a blade receiving slot (14). When the projection (2) of the rotatable sleeve (1) is released and the rotatable sleeve (1) is returned to an initial position under the torsion spring's force, the spiral surface (15) of the rotatable member (7) compresses on the rear side surface of the locking member (5) so as to make the locking member (5) to rotate downwardly about the rotatable shaft (6) and press out the saw blade (3). And at the same time the aperture (13) of the rotatable sleeve (1) will be unparalleled to the a blade receiving slot (14), i.e. the aperture (13) of the rotatable sleeve (1) will be unparalleled to saw blade (3), as shown in Fig.7 so as to the blade projections (20) of the saw blade (3) is

tightly clamped in the aperture (13) of the rotatable sleeve (1). As should be clear from the above description, the saw blade (3) will be securely locked within the clamping device.